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# The Polyporaceae of North America.—III. The Genus Fomes

By William Alphonso Murrill

The generic name *Fomes* is usually accredited to Fries, but this author never employed it to designate a genus. In Novae Symbolae, 46, 1851, the genus *Polyporus* is subdivided into *Eupolyporus* and *Fomes*, the latter division being described as follows:

> "Pileus primitus lignoso-induratus (raro molles, plorantes), contextu floccoso intertexto, crusta rigida obductus, azonus, sed demum concentrice sulcatus. *Fungi perennes* (*vulgo stratose*), *reviviscentes, sed stratum annuum vegetum tantum est.*"

In listing species Fries wrote the word *Fomes* in parenthesis after *Polyporus*.

Gillet (Champ. France, **1**: 682. 1878) raised *Fomes* to generic rank and described the group as follows:

> "Hyménium poreux; pores non séparables entr'eux, distincts du chapeau, disposés par couches stratifiées. Espèces ligneuses-subéreuses, stipitées, dimidiées ou résupinées, recouvertes d'une croûte dure, épaisse et st. marquée de zônes annuelles séparées par des sillons concentriques. Champignons vivaces à accroissement indéfini."

Under this genus Gillet lists thirteen species, the first being *F. marginatus*, which is therefore considered its type. Most of the remaining species of *Fomes*, as the term is used in Saccardo's Sylloge, were assigned to this category by Cooke in Grevillea (v. 13 and 14, 1884–85). Karsten was the first to divide generically this large group of perennials, which now comprises a half dozen or more genera, the name *Fomes* being connected with the natural subdivision to which *F. marginatus* belongs. Karsten's name *Fomitopsis*, applied to this subdivision in 1881, unfortunately becomes a synonym of *Fomes*. His names *Ganoderma* and *Elfvingia*, however, hold for other important subdivisions.

## Synopsis of the North American Species

1. Context white or yellowish. 2.
   Context flesh-colored, pileus often effused or effused-reflexed, flesh-colored, soon blackening, tubes round, 3–4 to a mm. 1. *F. roseus.*
2. Pileus over 3 cm. broad. 3.
   Pileus less than 3 cm. broad. 8.
3. Pileus encrusted, surface darker than the context. 4.
   Pileus rarely encrusted, surface concolorous with the context. 9.

4. Pileus thick, sulcate, ungulate, rarely applanate. 5.
Pileus at first thin, triangular or lobed, shining reddish-chestnut above, becoming dimidiate, ungulate at the center, and dull brown: spores ovoid, 3.5 × 5 μ. Pileus attached by a lateral stipe which soon disappears. 7. *F. stipitatus.*
Pileus thin, distinctly zonate, irregular or applanate, crust brown to black: spores ovoid, hyaline, 6 × 4 μ. 2. *F. annosus.*

5. Surface not soon rimose, older pores not visible. 6.
Surface soon becoming rimose, deeply sulcate, older pores visible in the upper projecting annual layers: pileus exactly ungulate, found only on *Shepherdia.* 4. *F. Ellisianus.*

6. Pores 4–5 to a mm. 7.
Pores 2–3 to a mm.: pileus subtriangular, gray to black, context white to pale cinnamon: spores ellipsoidal, 7–8 × 6–7 μ; abundant on *Fraxinus.* 5. *F. fraxinophilus.*

7. Pileus applanate, many times sulcate, horny encrusted, extremely hard in substance; tropical. 6. *F. ligneus.*
Pileus ungulate, applanate when very large, deeply annually sulcate, surface often resinous, bay or black in color; abundant on coniferous trees in temperate regions. 3. *F. ungulatus.*

8. Pileus ungulate, becoming black only at the base, zonate and concentrically sulcate in age, tubes over 0.2 cm. long. 8. *F. Ohiensis.*
Pileus scutellate, uniformly black when quite young, tubes less than 0.2 cm. long, context thinner than tube-layer. 9. *F. scutellatus.*

9. Pileus cylindrical, tubes long, visible at edges of older strata, context friable, becoming bitter; growing on conifers. 10. *F. Laricis.*
Not as above. 10.

10. Pores large, 2 to a mm., becoming reddish when bruised, annual strata separated by thick layers of context; tropical. 13. *F. rubritinctus.*
Pores small, 5–7 to a mm., not changing to reddish when bruised. 11.

11. Tubes less than 2 mm. long each season, context punky, hymenium glistening, not becoming dark in color. 11. *F. populinus.*
Tubes more than 2 mm. long each season, context hard and rather friable, hymenium becoming smoky or brownish, cracking in age. 12. *F. Meliae.*

### 1. Fomes roseus (Alb. & Schw.) Cooke

*Boletus roseus* Alb. & Schw. Consp. Fung. 251. 1805.

*Polyporus roseus* Fr. Syst. **1**: 372. 1821.

*Polyporus carneus* Nees, Nov. Act. Nat. Curios. **13**: *pl. 3.* 1827.

*Fomitopsis rosea* Karst. Rev. Myc. **3**: 18. 1881.

*Fomes roseus* Cooke, Grevillea, **14**: 19. 1885.

*Fomes carneus* Cooke, Grevillea, **14**: 21. 1885.

This fungus is very widely distributed and does serious injury to various coniferous trees both in Europe and America. Its form varies greatly with the character of the host plant. Besides the names mentioned above, *P. rufo-pallidus* Trog (Flora, **15**: 556.

1832. Fries, Icon. *pl. 186. f. 1*) doubtless refers to the same plant and I have a suspicion that *Polystictus arcticus* Fr. is also a synonym, since plants at Kew collected near Carlton in May, 1858, are only grayish zonate forms of *F. roseus.* The actual types of *P. arcticus* I have not seen.

A few of the collections examined are here listed: Finland (Karsten), Canada (Macoun, Dearness), Maine (Miss White), Newfoundland (Waghorne?), New Hampshire (Minns, Underwood), Ohio (James), New Jersey (Ellis), Colorado (Bethel, Pammell), West Virginia (Nuttall), Washington (Piper), Florida (Calkins), Nebraska (Kennedy), South Carolina (Ravenel), Alabama (Peters), California (McClatchie), Connecticut (Underwood), Georgia (Underwood).

### 2. FOMES ANNOSUS (Fr.) Cooke

*Polyporus annosus* Fr. Syst. **1**: 373. 1821. Icon. *pl. 186. f. 2.*

*Polyporus serpentarius* Pers. Myc. Eur. **2**: 82. 1825.

*Polyporus subpileatus* Weinm. Fl. Ross. 332. 1836.

*Polyporus resinosus* Rostk.; Sturm, Deutsch. Fl. **4**: 61–62. *pl. 29.* 1838.

*Trametes radiciperda* R. Hartig, Wicht. Krankh. Waldb. 62. 1874.

*Fomitopsis annosa* Karst. Rev. Myc. **3**: 18. 1881.

*Fomes annosus* Cooke, Grevillea, **14**: 20. 1885.

*Heterobasidion annosum* Bref. Untersuch. **8**: 154. *pl. 9.* 1889.

*Polyporus irregularis* Underw. Bull. Torrey Club, **24**: 85. 1897.

Kreiger 121, Romell 13, Sydow 3107, 1108, 504, Allescher & Schnabl 137, 432, Roumeguère 3111, 7248, Rabenhorst 405, de Thümen 106, Kunze 1, Briosi 2, Cavara 324. Sweden (Murrill), Tyrol (Bresadola), California (Harkness), Oregon (McBride), West Virginia (Nuttall), Pennsylvania (Gentry), Alabama (Earle, Baker, Woodward), Florida (Gory).

Many other specimens have been examined, but the abovementioned are sufficient to show that the plant is of wide distribution. It is particularly injurious to various species of coniferous trees.

### 3. FOMES UNGULATUS (Schaeff.) Sacc.

*Boletus igniarius* Scop. Fl. Carn. ed. 2. **2**: 469. 1772. Not *B. igniarius* L. 1753.

*Boletus ungulatus* Schaeff. Fung. Bav. **4**: 88. *pl. 137, 138.* 1774.

*Boletus fulvus* Schaeff. Fung. Bav. **4**: 89. *pl. 262.* 1774.

*Boletus semiovatus* Schaeff. Fung. Bav. **4**: 92. *pl. 270.* 1774.

*Boletus marginatus* Pers. Obs. **2**: 6–7. 1799.

*Boletus pinicola* Sw. Vet. Akad. Handl. 88. 1810.

*Polyporus marginatus* Fr. Syst. **1**: 372. 1821.

*Polyporus pinicola* Fr. Syst. **1**: 372. 1821.

*Fomes marginatus* Gill. Champ. Fr. **1**: 683. 1878.

*Fomitopsis pinicola* Karst. Rev. Myc. **3**: 18. 1881.

*Fomes pinicola* Cooke, Grevillea, **14**: 17. 1885.

*Fomes ungulatus* Sacc. Sylloge, **6**: 167. 1888.

A large and widespread species growing abundantly on coniferous trees, such as the hemlock and pine, and found more rarely upon deciduous trees standing near its usual hosts. Beech, elm, maple and birch are known to have been attacked by it in American and European forests where conifers abound. Fresh specimens collected on fir trees in Sweden correspond in all respects with Schaeffer's *B. ungulatus*, so I do not hesitate to use his name. Collections showing the range of this plant are as follows: Saxony (Krieger 13), Sweden (Romell 116, Murrill), Siberia (de Thümen 1906), France (Roumeguère 2205), Bohemia (de Thümen 814), Hungary (Linhart 250, 446), Canada (Macoun), New Hampshire (Minns), New York (Atkinson, Underwood, Murrill), Colorado (Crandall, Cockerell), West Virginia (Nuttall), Michigan (Wood), Maine (Ricker), Virginia (Murrill).

### 4. FOMES ELLISIANUS Anders.

*Fomes Ellisianus* Anderson, Bot. Gaz. **16**: 113. *pl. 12.* 1891.

*Fomes circumstans* Morgan, Jour. Cincinnati Soc. Nat. Hist. **18**: 37. *pl. 1. f. 4.* 1895.

This species was described from plants collected by Anderson in Montana during the summer of 1889. Its only host thus far reported is *Shepherdia argentea* Nutt., on the living trunks and branches of which it is very abundant in the Teton Valley.

Morgan's description is based on a collection in Dakota by T. A. Williams from the same host. His name refers to the half-encircling habit of the plant when it grows upon a branch. The fungus has also been collected in Colorado.

5. FOMES FRAXINOPHILUS (Peck) Sacc.

*Polyporus fraxinophilus* Peck, N. Y. State Mus. Rept. **35**: 136. 1882.

*Fomes fraxinophilus* Sacc. Sylloge, **6**: 172. 1888.

Ohio (Morgan, Gentry), Kentucky (Kellerman, Price), Missouri (Demetrio), Kansas (Bartholomew), Nebraska (Bates), Pennsylvania (Martindale), Iowa (McBride), Indiana (Underwood), New York (Peck).

This species is confined to the ash, on which it is very common. It has been confused with *P. fraxineus* (Bull.) Fr. by Cooke and some other mycologists. Anderson's no. 537 in the Parasitic Fungi of Montana was distributed under the name of *P. fraxinophilus* before it was described as *Fomes Ellisianus*.

6. FOMES LIGNEUS (Berk.) Cooke

*Polyporus ligneus* Berk. Ann. Nat. Hist. **3**: 387. 1839.

*Fomes ligneus* Cooke, Grevillea, **13**: 119. 1884.

Excellent specimens were collected in Nicaragua by C. L. Smith and in St. Kitts by Britton and Cowell. Plants from Mauritius at Kew bearing this name are specifically distinct from our fungus. *Fomes sulcatus* Cooke from Demarara is nearly allied to *F. ligneus*.

7. **Fomes stipitatus** sp. nov.

A plant of medium size with short evanescent lateral stipe, shining reddish-chestnut crust and broad white thin margin. Pileus exceedingly hard and horny, flat and triangular or somewhat circular when young, becoming dimidiate with ungulate center and thin spreading margin, which is usually lobed and often deeply cleft; hymenium normally plane, but frequently convex because of the upturned margin, 5 x 10 x 3 cm.; surface glabrous, varnished, reddish-chestnut, with numerous shallow concentric furrows, becoming shining black and at length dull smoky-brown; margin broad, flat, glabrous, obtuse, 3 mm. thick, crenate to cleft, sterile portion 0.5 cm. wide, white: context hard, woody, 0.5–1 cm. thick, pale ochraceous, with strands of dark-brown shining horny substance extending from the stipe to the margin in a tree-like fashion: tubes plainly though unevenly stratified, 2–4 mm. long each season, 4–5 to a mm., grayish-brown within, mouths circular, white or very pale yellow, dissepiments thick, obtuse, entire: spores broadly ovoid with attenuate base, light yellowish-brown, smooth, $3.5 \times 5\,\mu$: stipe lateral, $1 \times 1$ cm., cylindrical, equal, glabrous, shining black to dull brown, with substance like the context, apparently absorbed or overgrown as the pileus enlarges.

This very distinct and easily recognized species was collected by C. L. Smith and B. Shimek in Nicaragua during the winter of 1891–92. Its conspicuous varnished surface and lateral stipe suggest at once the genus *Ganoderma*, but more important characters connect it with *Fomes* and I have with some hesitation assigned it to this genus, recalling the fact that *Fomes ungulatus* often has considerable varnish on its surface and that an umbo often has its beginning in a reduced stipe.

### 8. **Fomes Ohiensis** (Berk.)

*Trametes Ohiensis* Berk. Grevillea, **1**: 66. 1872.

This plant is unusually small for the genus *Fomes*, making with *F. scutellatus* a rather distinct subgroup. It grows upon rails and dead branches of various deciduous trees. Among collections examined are those from Canada (Dearness), Kansas (Cragin), Michigan (Dennen), Ohio (James), New York (Peck).

### 9. FOMES SCUTELLATUS (Schw.) Cooke

*Polyporus scutellatus* Schw. Trans. Am. Phil. Soc. **4**: 157. 1832.

*Fomes scutellatus* Cooke, Grevillea, **14**: 19. 1885.

This minute species was described by Schweinitz from material collected on *Syringa* in Pennsylvania. It has since been found on alder, witch hazel, sweet gum and other deciduous shrubs and trees. Some of the collections examined are as follows: Pennsylvania (Everhart), Florida (Calkins), Maine (Harvey, Blake), Canada (Macoun), Delaware (Commons), Ohio (James), Alabama (Mell).

### 10. **Fomes Laricis** (Jacq.)

*Boletus Laricis* Jacq. Miscel. **1**: 164–203. *pl. 20–21.* 1778. Bull. Herb. France, *pl. 296.* 1786.

*B. officinalis* Villars, Delph. 1041. 1786.

*B. purgans* Pers. Syn. 531. 1801.

*Polyporus officinalis* Fr. Syst. **1**: 365. 1821.

This fungus has been known from ancient times on account of its medicinal properties and is still collected in considerable quantities in the larch forests of Europe and Asia for use in medicine. Single specimens are sometimes found weighing as much as fifteen pounds in the dry state. Many of the older botanists mention this plant. Bauhin (Pinax, 375. 1623) gives a good general description of it under the name "*Agaricum, sive fungus laricis.*" Micheli figures it (Gen. *pl. 61. f. 1.* 1729). Even Dioscorides knew its value. According to Miss Southworth, the substance of the fungus consists mostly of resin-granules about knots of mycelium, containing at times one or more curiously shaped bodies resembling branching bast cells, which grow out from the mycelium. These resin-granules contain the medicinal properties.

The European host of this fungus is the living larch. In America, it has been found also on pine and spruce. Specimens found in Michigan in 1886 on living white pine were used by Calkins and others instead of quinine. MacDougal collected a very handsome specimen on dead spruce in Montana in July, 1901. Macoun also found it on spruce in British Columbia in April, 1889. A recent note in Science from Professor Bessey refers to specimens received by him from Montana and the Yellowstone Park, collected on undetermined species of conifers. Calkins' report of this species in America a dozen or more years ago evidently escaped Professor Bessey's attention.

### 11. FOMES POPULINUS (Schum.) Cooke

*Boletus populinus* Schum. Enum. Pl. Saell. **2**: 384. 1803.

*Poria obducens* Pers. Myc. Eur. **2**: 104. 1825.

*Polyporus connatus* Weinm. Fl. Ross. 332. 1836. En. Stirp. Petrop. 208. 1837.

*Polyporus connatus* Fr. Epicr. 472. 1836–1838. Icon. *pl. 185. f. 2.*

*Fomes connatus* Gill. Champ. France, **1**: 684. 1878.

*Fomes populinus* Cooke, Grevillea, **14**: 20. 1885.

Finland (Karsten), Bavaria (de Thümen), Germany (Sydow), England (Massee), Sweden (Murrill), Canada (Dearness, Macoun), Georgia (Ellis), Ohio (James, Morgan), Delaware (Commons), New York (Earle, Underwood), Massachusetts (Underwood), Pennsylvania (Herbst), Florida (Martin), New Jersey (Ellis), Missouri (Glatfelter).

The favorite host of this species is the maple, though it is also found on poplar, linden and a few other deciduous trees. Living Norway maples in Sweden were found to be seriously injured by its attacks, and I have noticed it on this and other species of maple used as shade-trees in American cities.

### 12. **Fomes Meliae** (Underw.)

*Polyporus Meliae* Underw. Bull. Torrey Club, **24**: 85. 1897.

Described from specimens collected by Underwood on branches of *Melia Azederach* in 1895. It also occurs on *Gleditsia* and *Fraxinus*, as is indicated by the recent Alabama collections of Earle and Baker.

### 13. **Fomes rubritinctus** sp. nov.

A large perennial plant of many layers, the upper partly dead and discolored, the lower smooth, light-colored and anoderm with large pores, which become dark red when bruised. Pileus corky to woody, dimidiate, convex, 4–12 × 5–15 × 3–10 cm.; surface anoderm, smooth, velvety to the touch, white or pallid, becoming dark brown and roughened with age; margin obtuse, sterile, concolorous: context corky, becoming woody, pallid, 1.5 cm. thick: tubes unevenly stratified, the layers separated by unusually thick cushions of context, 0.5–1.0 cm. long each season, 2 to a mm., isabelline within, becoming umbrinous in the older layers; mouths subcircular or polygonal, edges thin, isabelline, becoming dark red when bruised: spores ovoid to globose, 5–7 $\mu$ long, smooth, hyaline, wall of medium thickness, hyphae hyaline.

Collected by C. L. Smith in Nicaragua and distributed as no. 138 of his Central American Fungi.

### SPECIES INQUIRENDAE

*Fomes geotropus* Cooke, Grevillea, **13**: 119. 1884 (*Polyporus geotropus* Cooke, Grevillea, **13**: 32. 1884). This species is allied to *Fomes ulmarius* Fr. It was described from collections in Demerara, but seems to range northward to Mexico, Florida and Alabama. Other doubtful or unknown species are: *Fomes perpusillus* (Pers.) Cooke, *F. extensus* (Lév.) Cooke, *F. aegerita* (Fr.) Cooke, *F. microporus* (Sw.) Cooke, and *F. albogriseus* Peck.

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